

Tilburg University

Unraveling the age-productivity nexus

van Dalen, H.P.; Henkens, C.J.I.M.; Schippers, J.

Publication date:
2009

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

van Dalen, H. P., Henkens, C. J. I. M., & Schippers, J. (2009). *Unraveling the age-productivity nexus: Confronting perceptions of employers and employees*. (CentER Discussion Paper; Vol. 2009-4). Macroeconomics.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

No. 2009–04

**UNRAVELING THE AGE-PRODUCTIVITY NEXUS:
CONFRONTING PERCEPTIONS OF EMPLOYERS AND
EMPLOYEES**

By Hendrik P. van Dalen, Kène Henkens, Joop Schippers

January 2009

ISSN 0924-7815

Unraveling the Age-Productivity Nexus: Confronting Perceptions of Employers and Employees

Hendrik P. van Dalen^{1,2}, Kène Henkens², and Joop Schippers³

January 12, 2009

(1) CentER, Tilburg University
Room K 425
P.O. Box 90153
NL-5000 LE Tilburg
The Netherlands
Email: h.p.vandalen@uvt.nl

(2) Netherlands Interdisciplinary Demographic Institute (NIDI)
P.O. Box 11650
NL-2502 AR The Hague
The Netherlands
Tel: +3170-3565237
Fax: +3170-3647187
Email: dalen@nidi.nl

(3) University of Utrecht
Utrecht School of Economics
Janskerkhof 12
NL - 3511 BG Utrecht
The Netherlands
Email: j.schippers@econ.uu.nl

Keywords: aging, stereotypes, productivity, employers
JEL-codes: D21, J24, J71, M51

Abstract

What determines the perceived productivity of young and older workers? In this study we present evidence for (Dutch) employers and employees. By confronting the perceptions of employers and employees some remarkable similarities and differences are revealed. It turns out that productivity perceptions are biased by the age group to which one belongs and the position in the hierarchy in the organization. The young favor the young, the old favor the old and employers discount productivity compared to employees. However, there are also remarkable similarities across employer and employees. By distinguishing the various underlying dimensions of productivity of young and older workers we tested whether ‘soft’ skills and abilities within the organization are just as important as the ‘hard’ dimensions - cognitive and physically based skills - in the eye of employers and employees. It appears that employers and employees weight the soft and the hard dimensions of skills in a uniform way: hard skills are far more important than soft skills no matter whether the worker is old or young. By sharing the stereotypical images the problem of age discrimination may therefore not only be due to employers’ behaviors and attitudes, but also due to those of employees.

1. Introduction

According to the United Nations (2006) the work force of western countries will age rapidly in the coming decades. In Europe the median age of the population is projected to rise from 39 years in 2005 to 47 years in 2050, and in the US the corresponding age rises from 36 to 41 years. Older workers will become a more prominent group on the labor market and this development will be a concern for all organizations as an aging work force is associated with slowdown in productivity and economic growth (OECD, 2006). The prospect of an aging work force has therefore put questions with respect to the age-productivity nexus high on the research agenda.

Understanding the relationship between age and performance goes to the heart of debate about the economic consequences of work force aging. Research on the age-productivity nexus takes place within various disciplines and with various methods and various units of measurement. For instance, macroeconomic studies tend to focus on isolating the effect of population age structure on labor productivity and the general consensus seems to be that an aging population is associated with a negative effect on productivity (Davis, 2005; Feyrer, 2008; Tang & MacLeod 2006) or economic growth (Bloom & Williamson, 1998). However, at this level of aggregation the mechanisms through which this result comes about remain unclear. Studies with a focus at the micro level of firms or employees shed more light on the precise relationship between age and productivity but at the same time the body of research focusing on this relationship has produced mixed results. An early meta-analysis performed by Waldman and Avolio (1986) showed that age was positively related to productivity measures of job performance, but weakly negative related to supervisor's ratings of performance. McEvoy and Cascio (1989) showed on the basis of 65 empirical studies that the relationship between age and performance was virtually absent. Later on Sturman (2003) refined the previous insights by performing a meta-analysis of 115 empirical studies. By making use of three age-related variables (chronological age, job experience, and organizational tenure) he showed that the relationship follows an inverted U-shape: a positive relationship between age and performance at young ages and a negative job performance relationship when age is high (49 years or older). Finally, Ng and Feldman (2008) evaluated the relationship between age and ten dimensions of job performance on the basis of 380 empirical studies. They suggest that the reason for mixed findings is to be traced to the fact that previous studies have focused rather narrowly on core task activities and neglected the

activities which affect the environment in which core tasks take place, by some described as ‘organizational citizenship behavior’ (LePine et al., 2002). They found that age is largely unrelated to core tasks activities, creativity and performance in training programs but strong relationships were found between age and non-core tasks which benefit the organization at large, such as organizational citizenship behavior, safety performance and counterproductive work behavior (like workplace aggression, tardiness and absenteeism).

Where the empirical evidence is far from conclusive on the relationship between age and productivity, the evidence is unambiguous with respect to the vulnerability of older workers on the labor market. Older workers may perhaps exercise choice over whether or not to retire, their opportunities to remain in the labor force or to change jobs or careers are largely determined by employers. As the OECD has made clear in a recent report on extending working careers “early exit from the labor market tends to be a one-way street, with very few older workers returning to employment.” (OECD, 2006, p. 10). In general fewer than 5 percent of those inactive aged 50-64 are in jobs one year later. In other words, once older workers become unemployed the prospects of regaining employment are very low (OECD, 2006, p. 35). These observations suggest that negative stereotypes regarding older workers are widespread and that these stereotypes hamper the employment prospects of older workers.

In this study we present evidence on the question whether perceptions on the productivity of young and older workers differ among employers and employees and how these views are related to specific skills and capabilities of young and older workers. These questions will be answered by the use of two representative surveys among employees and employers in the Netherlands.

This study extends the existing literature on stereotyping of older workers by: (1) confronting the perceptions of employers and employees about the productivity of older workers but also of young workers. The question whether stereotypes of employers regarding workers are shared equally by employees is important. If employees do share the stereotypical images, the problem of age discrimination may not only be due to employers’ behaviors and attitudes, but also due to those of employees. By looking at employers and employees we are able to (2) discern the ingroup bias in making productivity assessments, a bias which can stem not only from the age of the actor in question, but also from the position within the organization:

employer or employee; (3) by distinguishing the various underlying dimensions of productivity of the stereotypical young and older worker, thereby paying attention to the criticism made by Skirbekk (2008) who stresses the use of underlying skills in deriving the productivity potential of workers; (4) by testing whether ‘soft’ and pro-social activities within the organization are just as important as cognitive and physically based skills in the eye of employers-employees.

To start off we will first present a brief overview the two main building blocks underlying the use of stereotypes (presented in Section 2): the cognitive functional approach and the social identity theory. In Section 3 we present the data used and in Section 4 the results revealing group biases in evaluating productivity are presented.

2. Stereotyping the productivity of young and old workers

Theory of stereotypes

Employers and supervisors have to rely on perceptions of productivity when hiring, firing or retaining workers. Assessing productivity is in most cases a complex information-processing task. People’s perceptions enable them to process and order information as effectively as possible. In order to do so, we engage in categorization and stereotyping. Categorizing entails that when information is taken in, it is ‘stored’ in categories (pigeonholing) that correspond to certain places in our memory (Brewer et al., 1981). Thinking in terms of categories is said to be “cognitively economical” (Macrae & Bodenhausen, 2001: 241). Creating social categories is based on a person’s characteristics, such as age, sex, race, ethnicity and social status. Stereotyping is closely related to categorization but at one point distinctly different. Hilton and Von Hippel describe stereotypes as: “Beliefs about the characteristics, attributes, and behaviours of members of certain groups [...] and beliefs about how and why these attributes go together” (Hilton & Von Hippel, 1996: 240).

The above definition refers to *groups* of people. Members of a group tend to overestimate the similarities between members *of the same group* and to underestimate the differences (Linville et al., 1989; Verkuyten & Nekuee, 1999). As a result, the differences *between groups* are perceived to be much greater than they actually are. Categorizing and stereotyping lead people to be more inclined to attribute positive characteristics to members of their own group (ingroup bias) and more negative characteristics to members of other groups (outgroup bias) (Lalonde & Gardner, 1989; Tajfel & Turner, 1979). Stereotypes are not necessarily negative, but

stereotypes about 'outgroup' members tend to be less favorable than those about ingroup members (Hilton & Von Hippel, 1996; Tajfel & Turner, 1979). In social psychology, the stereotyping process is described from different perspectives. The two main approaches are the cognitive functional approach and the social identity theory.

The cognitive functional approach deals with information processing and selection, and remembering this information. This approach is based on the idea that people are information processors and that their capacity to take in and digest information is limited. These limitations give rise to systematic errors when information is being processed, which in turn leads to the creation and perpetuation of stereotypes (see also Bodenhausen, 1988). Another assumption of this approach is that, in mental terms, activating categorical information is easier than forming an opinion about others on the basis of one's own impressions (Fiske & Neuberg, 1990; Macrae & Bodenhausen, 2001; Pendry & Macrae, 1994). The first mechanism assumes that having information about personal characteristics contributes to the creation of perceptions which allow for more nuances (see Vrugt & Schabracq, 1996). This would lead one to assume that people who have more information or who are able to process more information, tend to create more qualified perceptions.

A second line of research used to explain stereotypes draws on social identity theory (Tajfel & Turner, 1979) or, as some call it, self-categorization theory (Oakes et al., 1994). These theories are based on the assumption that people categorize the world on the basis of the social groups to which they belong and/or with which they identify themselves. In doing so, people try to take on a positive identity. They compare themselves with other individuals or groups in an effort to distinguish themselves favorably from other groups. People evaluate others in terms of the degree to which they are similar (Lalonde & Gardner, 1989; Tajfel & Turner, 1979). Within this framework, Ashmore and DelBoca (1981) speak of a dynamic and a socio-cultural approach. The dynamic approach assumes that stereotypes act as self-protecting devices. People hold stereotypical views of others or of other groups because these others are considered to be a threat to the person in question. The socio-cultural approach is based on the idea that people create stereotypical perceptions, values, attitudes and expectations about others (outgroups) as a result of socialization processes and that these perceptions are not questioned within their own reference group (the 'ingroup'). Socialization processes lead people to acquire a sense of

belonging to a particular ingroup, thus setting themselves apart from members of the outgroup in a negative sense (Ashmore & DelBoca, 1981). Snyder and Miene (1994) suggest that older adults may present a threat to the young because thinking of aging reminds young people that they too will grow old. By blaming older adults instead of the aging process itself, the use of stereotypes can be seen as serving an ego protection function. Moreover, older workers often occupy the most senior positions in organizations; these positions may conflict with the career prospects of younger employees (Ekamper, 1997). Following Finkelstein et al. (1995), we call this the ‘in-group bias’ hypothesis.

Stereotypes and productivity

So far the theory of stereotypes presented above is silent on the productivity of older workers. Although gradually more and more information is cumulated (cf. Munnell and Sass, 2008), research of perceptions of productivity by employers and employees is still rather limited. An early study was carried out by Kirchner and Durnette (1954) who asked production workers and supervisors about the problems of older employees. Kirchner and Durnette (1954) and Bird and Fishers’ (1986) replication of this study led to the conclusion that supervisors had less positive attitudes towards older workers than did production workers. Several other studies have shown that biases against older workers are quite pervasive (Blocklyn, 1987; Chui et al., 2001; Finkelstein et al., 1995; Finkelstein & Burke, 1998; Hassel & Perrewe, 1995; Henkens, 2000; Lee & Clemons, 1985; Loretto et al., 2000; McGregor & Gray, 2002; Remery, et al., 2003; Rosen & Jerdee, 1976 a, b; Taylor & Walker, 1994, 1998; Wagner, 1998; Warr & Pennington, 1993). This body of research has shown that attitudes and stereotypes about older workers are mixed, that is, older personnel is viewed as having both positive and negative attributes. Positive characteristics attributed to older employees include experience, loyalty to the organization, reliability and interpersonal skills. Qualities such as the acceptance of and the ability to use new technologies and the adjustment to organizational changes are attributed primarily to the younger workforce. Most of the studies are, however, highly descriptive and focus on separate skills or abilities. Apart from research carried out by Warr and Pennington (1993) and recently by Chiu et al. (2001) and Henkens (2005), little effort has been made to distinguish overarching dimensions of stereotypes about older workers. This is in contrast with many studies outside the field of labor markets

or organization studies that show that attitudes toward older people are multidimensional (Chasteen et al., 2002; Hummerts et al., 1994, 1997; Schmidt & Boland, 1986). The multidimensionality is underdeveloped with respect to the age-related stereotypes in the workplace. Finkelstein et al. (2000) carried out a study in which managers were asked to give written justifications of employment-related ratings that were used in a content analysis. The study showed that the age of rated employees mattered to most managers. The analysis of employers' attitudes stresses the importance to distinguish various dimensions as one would expect from the changing demands for various job tasks over time (Autor et al. 2003). While the general health status of older work force has improved over time, the physical capabilities are not as important as they were in the past. The appearance of the computer has, for instance, affected the demand for specific tasks and has shifted away from routine tasks to non-routine problem solving tasks. As Munnell and Sass (2008, p. 94) state: "While physical capabilities have lost a great deal of economic value, cognitive and emotional capabilities have become critically important." Indeed, production in OECD countries has shifted from physically demanding and often routine industrial labor to the production of services which often entails non-routine tasks and knowledge based production. The overall impression from employers' surveys (Barth et al. 1993; Taylor & Walker, 1998; Henkens, 2005; Munnell et al., 2006) is that the emotional or the more social qualities enhance the attractiveness of older workers.

To answer the question what explains the perceived productivity of young and older workers one has to take account of the possibility that ingroup biases exist. In particular two hypotheses are relevant in this setting:¹

Hierarchy bias hypothesis: Employees are apt to judge the performance of the average 'worker' more favorable than employers.

Age bias hypothesis: Young (old) employees/employers are apt to judge the performance of the average 'young (old) worker' more favorable than older (young) employees/employers.

3. Data and methods

To test the above stated hypotheses we will use two databases: one specifically aimed at discovering the employers' attitudes regarding the pros and cons of an aging work force, and another database focusing on the perception of employees specifically constructed to mirror the employers' view.

Survey among employers

In May 2005 a questionnaire was sent to a sample of Dutch companies and organizations. The random sample, stratified by size of the organization to ensure that sufficient large companies were included, was drawn from the register of the Netherlands Chambers of Commerce. A sample of 1,384 companies was drawn from a sub-population of companies with at least 10 and at most 49 employees and another 1,993 companies were drawn from a sub-population of companies with at least 50 employees. The sector classification of the Netherlands Chambers of Commerce coincides with the European Union classification of economic activities, NACE. This classification is more or less the same as that used by Statistics Netherlands (SBI 1993). Companies in the agricultural sector were not included in the sample in view of the large percentage of self-employed and small companies in this sector. Separate sources were used for government and health care organizations as relatively few are registered with the Chamber of Commerce. All 462 Dutch municipalities were approached as well as 78 general hospitals.

The total sample comprises 3,930 organizations with at least 10 employees. Total response rate was 15.2 percent, which is comparable to the response rate of other employer surveys. Response rates for surveys in Europe and the United States tend not to be higher than 20 to 30 percent (see for example Brewster *et al.*, 1994; Kalleberg *et al.*, 1996). For this study we could make use of a total sample of 573 employers between the ages of 18 and 65 years.

Survey among employees

To confront the perceptions of employers we specifically designed an identical questionnaire to gather the perceptions of employees. The employee survey was carried out in March 2007 by the institute CentER Data of Tilburg University.

¹ To prevent confusion in the text, in the remainder of the paper we will use the term 'worker' and

CentER Data maintains an online nation-wide panel of households in the Netherlands. The panel is representative for the Dutch population with respect to sex, age, education, religion and regional variation. Respondents are interviewed through an internet connection, and for those who do not have access to internet, data are collected through a television Netbox system.² As such there is no selectivity with regard to whether people have access to internet or not. People participate generally about four years in the panel, during which they are interviewed on several topics regularly. When a respondent leaves the panel, a new respondent is selected on the basis of socio-demographic characteristics so that representativeness will be maintained. Because of the on-going nature of this type of survey, traditional response rates are not reported. Information was gathered about a total of 896 employees between the ages of 18 and 65 years.

Measurement

Many earlier studies (cf. Chui et al., 2001; Henkens, 2005; Loretto et al., 2000; McGregor & Gray, 2002; Taylor & Walker 1994, 1998; Warr & Pennington, 1993) on stereotyping older workers have used Likert-type items in which young and older workers are pitted against each other. For instance, in order to extract stereotypical views the statement ‘older workers are less productive than younger workers’ is used as a measure of productivity differences between young and older workers. This type of measurement masks possible differences between both categories of workers. In other words, it may mask differences in levels of productivity. To circumvent such problems this study uses a different approach by measuring stereotypes regarding young workers and older workers separately. The young worker in our survey was said to be 35 years or younger, and the older worker belonged to the age group 50 years and older. The respondents were given a list of qualities or skills. They were first asked “To what extent, in your view, do the following qualities apply to workers aged 50-plus?”, with answer categories 1. hardly, 2, somewhat, 3. strongly, and 4. very strongly. They were then asked “To what extent, in your view, do the following qualities apply to workers under 35?”, with the same answer categories. Based on a review of the human resource management literature, respondents were presented

‘employee’ to indicate the subject of study, respectively the respondent.

with aspects that could be seen as a dimension of productivity, to wit: creativity, physical or mental capacity to deal with workload, ability to deal with new technology, commitment to the organization, willingness to learn, flexibility, social skills, accuracy, customer-oriented skills, as well as their general assessment of productivity.

4. Results

Understanding the driving forces behind stereotypes regarding the productivity of younger and older workers and testing for the age and hierarchy bias starts with looking at the basic perceptions of productivity. In Table 1 we present the answers to the question on how employees – young and old - rate the productivity of young and older workers and whether their opinions differ from the perceptions employers hold? The percentages in Table 1 reflect employers' and employees' (positive) opinions about the productivity of workers aged 50 years and older and of those under 35 years of age.

A number of observations based on this cross tabulation can be made. The first observation deals with the comparison of the perceptions made by employees and employers. If we look at the lower part of the table – the answers given by employers – we see that employers perceive big differences in the productivity of the young and older workers. In general 77 percent of the employers have a clear positive opinion about the productivity of 'the' young worker, whereas only 40 percent of the employers has such a positive perception of older workers. Employees are also quite critical of older workers but less so compared to the employers' perception. There is however, one important exception to this rule: older employees. They are the only ones who see no difference between young and older workers: approximately 70 percent of the older employees (aged 50 years and older) has a positive opinion of the productivity of both young and older workers. Young(er) employees and employers of all ages were far more critical in this respect.

² Participants who do not have Internet access are provided with a facility by CentERdata, allowing them to access the Internet through their televisions. Households that do not have a TV set are given one by CentERdata. For more information on the panel data: www.centerdata.nl/en/

Table 1: Opinions of employees and employers about differences in perceived productivity between young and older workers^a

	<i>Positive opinion about the productivity of</i>		
	Young workers (under 35)	Older workers (aged 50-plus)	t-test for differences between old-young
Age groups respondents	<i>Percentages</i>		
<i>Employees</i>			
Under 35	81.6	47.9	8.2
35-49	74.1	53.1	6.3
50 and older	71.5	70.0	0.4
Total	75.4	56.8	8.2
<i>Employers</i>			
Under 35	82.2	33.6	8.2
35-49	77.0	38.1	10.6
50 and older	73.3	47.6	4.9
Total	76.9	40.0	13.7
t-test for differences employers-employees			
Both under 35	0.7	2.5	
Both 35-49	0.1	4.0	
Both 50 and older	0.9	4.8	
Total	0.4	6.4	

(a) Answers based on the question: "To what extent does the quality 'productive' apply to employees under age 35/aged 50-plus?" (answer categories 1. hardly, 2. somewhat, 3. strongly, and 4. very strongly). Sample size of employers N = 574; and of employees N = 898.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

A second observation can be made by taking a vertical look at Table 1, thereby searching for the presence of a hierarchy bias. By taking this perspective one can see that employers are more critical about the productivity of older workers than employees. This is clearly in line with the hierarchy bias hypothesis. But when one takes a look at how young workers are judged then this bias does not seem to exist: the perceptions of the productivity of young workers are almost identical across employers and employees (and the t-statistics testing the differences confirm this observation).

A third observation relates to the importance of age. Age biases can clearly be found with regard to the productivity of young as well as older workers. Moreover,

age biases can be observed among employers as well as employees. In the case of employers and employees we find that the older the respondent is, the more positive is the perception of older workers' productivity. We also find that the younger the respondent is, the more positive the perception is on the productivity of younger workers. Employers under the age of 35 appear to be most critical of the productivity of older workers.

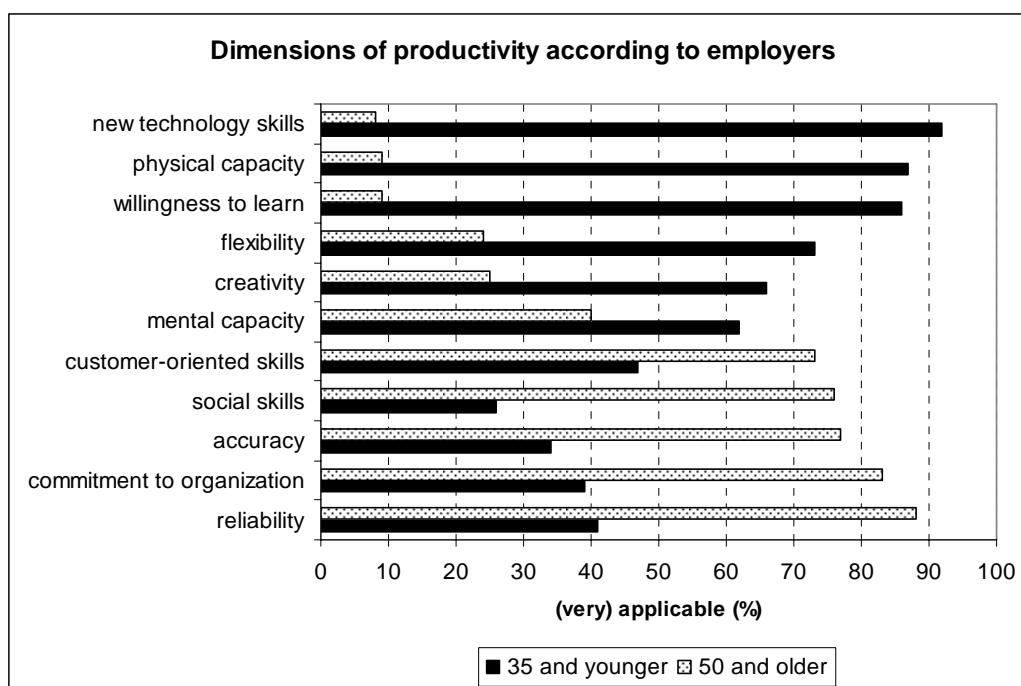
Unraveling multidimensionality productivity

The previous observations of productivity and 'tests' of the age and hierarchy biases generated confirmations but also exceptions and the logical step is to unravel productivity in underlying dimensions (cf. Skirbekk 2004, 2008). In actual practice it may very well be the case that, e.g., when people age they may value or see certain qualities in a different light compared to when they were young, or – to illustrate the hierarchy bias – when people are in the position of supervisor or employer they may value 'new technology skills' more highly than they would have in the position of employee. In other words, it matters how people – depending on which position they take – weigh qualities and skills that are of use in an organization.

As mentioned in Section 3 the surveys among employers and employees offer a more detailed set of abilities or skills which most workers make use of in day-to-day practice. In Figures 1 and 2 the positive ratings of specific abilities are presented, i.e. the extent to which certain abilities apply to young and older workers. Figure 1 gives the opinions of employers, Figure 2 the opinions of employees.

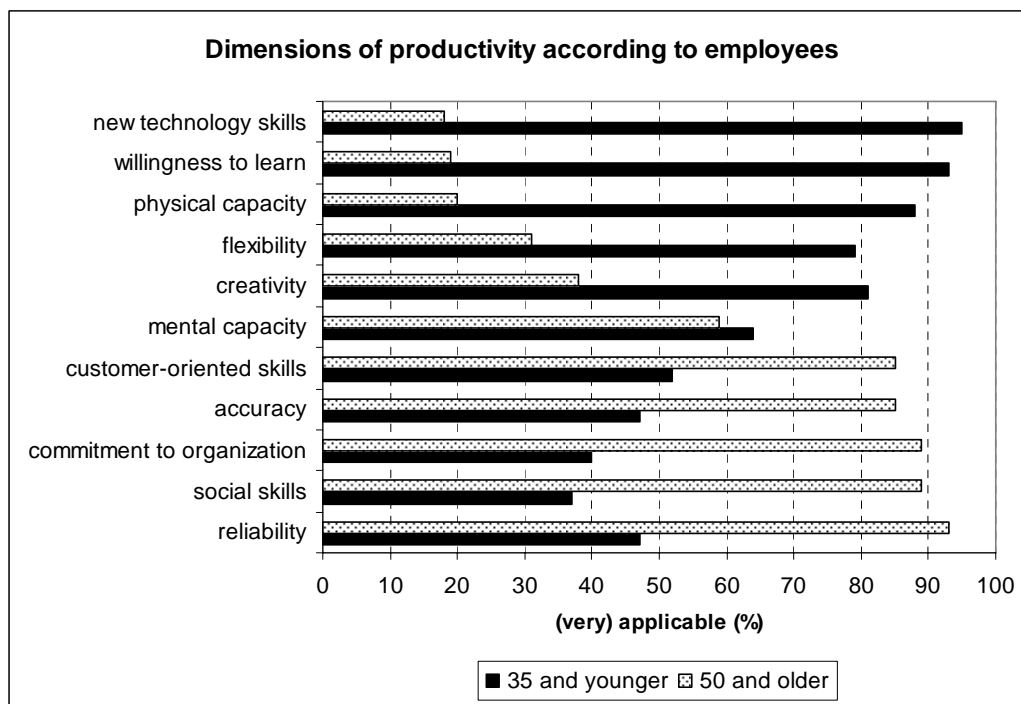
The *patterns* in the answers given by employers and employees are remarkably similar. Both employers and employees report large differences between young and older workers in terms of all the dimensions presented to them. In short, on abilities which young workers score high points, the older workers score low points, and vice versa. Older workers scored much higher than younger workers on the following elements of productivity: older employees are considered to have better social skills, to be more reliable, more accurate and more committed to their work. Younger employees on the other hand scored much better on such qualities as new technology skills, mental and physical capacity, willingness to learn and flexibility.

Figure 1: The underlying dimensions of productivity according to employers



Source: employer survey NIDI-UU (2005)

Figure 2: The underlying dimensions of productivity according to employees



Source: NIDI Employee survey, March 2007.

However, in order to detect how the overall productivity assessment is related to these underlying dimensions we have to measure the weighting scheme that is used implicitly by both employers and employees. To reduce the number of dimensions to a smaller number of underlying dimensions or qualities we first conducted a factor analysis. In order to bring out the differences across the assessments of young and old workers we have used the difference in scores and performed separate factor analyses for employers and employees. The results of this analysis are given in Table 2.

Table 2: Results of the factor analysis with varimax rotation of the difference scores between older and young workers on the underlying dimensions of productivity, views of employers and employees

	Employers		Employees	
	Factor 'hard qualities'	Factor 'soft qualities'	Factor 'hard qualities'	Factor 'soft qualities'
Willingness to learn	0.67	0.05	0.66	0.04
Physical capacity to deal with workload	0.66	-0.02	0.65	-0.07
New technology skills	0.60	-0.04	0.66	-0.03
Mental capacity to deal with workload	0.50	0.22	0.45	0.30
Flexibility	0.44	0.13	0.57	0.15
Creativity	0.31	0.07	0.48	0.10
Reliability	-0.01	0.66	-0.07	0.67
Commitment to the organization	0.08	0.61	0.06	0.69
Accuracy	0.08	0.58	0.04	0.64
Social skills	-0.06	0.46	0.05	0.62
Customer-oriented skills	0.13	0.41	0.10	0.59
Eigen value	2.23	1.39	2.07	2.22

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

The analysis shows that two underlying dimensions were clearly emphasized in the answers given by employers as well as employees. First of all, the 'soft' qualities which play a role in job performance, such as social skills, commitment, customer-oriented skills, accuracy and reliability. Some of these qualities are what Ng and Feldman (2008) refer to as 'organizational citizenship behavior': pro-social behaviors that are not job specific but that support the broader organizational environment in which core performance takes place. The second dimension, which we will refer to as

the ‘hard’ qualities, includes such qualities as the ability to cope with physical and emotional stress, new technology skills, willingness to learn and flexibility. Based on the factor analysis presented in Table 2 we have constructed two scales for both the employers and employees representing the hard and soft qualities of young and old workers. In the appendix A1 to this paper we list the internal consistency scores for both dimensions. At this point it is sufficient to know that at all levels these scores are satisfactory according to conventional standards of practice (Dunteman, 1989).

Multivariate analysis productivity

The final step in our analysis of stereotypes is to estimate the three equations which describe how employers and employees weight the hard and soft qualities in the perception of productivity and at the same time testing whether age and the position within the hierarchy of an organization biases the various productivity assessments. For matters of transparency we view the process by which respondents form their perceptions as a two-level process. At the first level perceptions about the soft and hard dimensions of worker types are formed. This is done by estimating the set of two equations explaining how soft and hard productivity dimensions are judged by respondents.³ At the second level perceptions of the overall productivity of worker types are formed, which are the product of a weighting scheme translating the soft and hard dimensions into an aggregate productivity perception. One could also have presented the last step for both young and older workers, but we expect a priori that the overall productivity and the underlying productivity dimensions are bound to be affected by age and hierarchy effects as well as other relevant explanatory variables, like sex, education and sector of industry in which the respondent works. The table with descriptive statistics of variables used in the analysis is presented in Appendix A2.

Estimation of these three equations (per worker type) is based on a pooled sample, i.e. the perceptions of 896 employees and 573 employers are pooled. This modeling strategy has the advantage that one can readily see the presence of a hierarchy effect, whereas a separate analysis for both employers and employees would make testing for the presence of the hierarchy effect more difficult. In the appendix to

³ Because the error terms of these two equations are correlated we have used seemingly unrelated regression analysis at this step.

this paper the separate analyses for employers (Table A3) and employees (Table A4) are presented to see that how estimation results differ.

Table 3 presents the final estimation results and the three columns show the three equations per worker age group. The focus of attention revolves around the equation which sheds light on how the production ‘factors’ are weighted in assessing the productivity of young and older workers. However, the underlying dimensions – hard and soft qualities in equations (1) and (2) – are discussed first because they show quite clearly how the age and hierarchy bias are present in the formation of perceptions.

The *age bias* – the aptitude to form positive judgements of one’s own (age) group – is present in all equations (1) and (2). The effect which age has on the perception of productivity of older workers is positive: the older the respondent the more positive this respondent is about the productivity of older workers. We find an opposite age effect on the perception of productivity of younger workers. Both effects are in line with age group bias hypothesis. The age bias is absent in the overall assessment as presented in equation (3), which suggests that age biases in stereotypes regarding the ‘hard’ and ‘soft’ qualities of young and older workers lie at the root of age biases in the overall productivity perceptions. There is no additional effect tied to the age of the employers or employees. This suggests that respondents have a reasoned, yet biased perception of the overall productivity. The appendix to this paper presents separate analyses of the age bias among employers and employees and these analyses show that our conclusions also hold for employers and employees separately. However, the age biases among employers are weaker and quantitatively less important than they are for employees.

The second effect of interest refers to the *hierarchy bias*. The results presented in Table 3 give a mixed outcome with the results of Table 1 still in mind. In Table 1 the hierarchy bias was not present for young workers, but it certainly was present in the perception of employers and employees when they made their assessment of the productivity of older workers, with employers being more negative about the productivity of workers than employees. The multivariate analyses in Table 3 reveal two interesting results. First of all, the hierarchy bias is present for both young and older workers. In determining the underlying soft and hard dimensions of productivity the employers discount the productivity of young and older workers compared to employees’ perceptions. Especially the productivity of older workers is heavily

Table 3: How do employer and employees weight hard and soft qualities of workers in evaluating overall productivity (pooled sample)?^a

Productivity assessments of the young worker						
	Soft qualities		Hard qualities		Overall	
	Equation (1)		Equation (2)		Equation (3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Soft qualities ^b	-	-	-	-	0.31**	9.02
Hard qualities ^b	-	-	-	-	0.52**	14.25
Employer	-0.06**	2.45	-0.20**	8.07	0.12**	3.67
Age	-0.008**	6.29	-0.004**	3.81	-0.000	0.12
Sex (male = 0)	0.04	1.64	-0.01	0.45	0.03	0.86
Education (low =0)						
Middle	-0.00	0.07	0.02	0.50	-0.01	0.13
High	-0.03	0.90	0.09*	2.52	-0.08	1.86
Sector (industry = 0)						
Services	-0.03	0.99	0.05	1.65	-0.01	0.27
Public sector	0.08**	2.58	0.05	1.52	-0.03	0.91
Constant	2.70**	33.56	3.20**	42.54	0.57**	3.74
Adj. R ²	0.05		0.06		0.24	

Productivity assessments of the older worker						
	Equation (1)		Equation (2)		Equation (3)	
Soft qualities ^b	-	-	-	-	0.26**	7.80
Hard qualities ^b	-	-	-	-	0.60**	17.22
Employer	-0.25**	9.52	-0.28**	10.82	-0.07*	2.14
Age	0.010**	7.65	0.011**	9.33	0.000	0.07
Sex (male = 0)	0.01	0.30	-0.01	0.55	0.00	0.06
Education (low =0)						
Middle	0.02	0.63	-0.02	0.69	0.01	0.29
High	0.04	1.03	0.03	0.81	0.14**	3.04
Sector (industry = 0)						
Services	0.02	0.49	0.02	0.70	0.03	0.70
Public sector	-0.04	1.27	0.02	0.61	0.06	1.52
Constant	2.70**	33.17	1.71**	21.87	0.33*	2.46
Adj. R ²	0.10		0.14		0.32	

(a) * p < 0.05; ** p < 0.01; N = 1469.

(b) Soft qualities include: social skills, reliability and commitment, accuracy and customer-oriented skills; hard qualities include: creativity, mental and physical capacity to deal with workload, new technology skills, willingness to learn and flexibility.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

discounted. The soft qualities of older workers are valued -0.25 points less by employers and the hard qualities by -0.28 points, which is quite substantial on a scale from 1 to 4.

A second observation to be made is the finding that, even though the hierarchy bias works through the underlying productivity dimensions, at the level where the overall productivity is assessed there still remains a hierarchy bias. This hierarchy bias may very well be termed a true bias as the underlying ‘hierarchy bias’ which works through the soft and hard qualities is already accounted for. This ‘true’ hierarchy bias is positive in the case of the young worker and negative in the case of the older worker.

Finally, equation (3) in Table 3 shows how soft and hard qualities affect the overall assessment of the productivity of young and older workers. Table 3 shows that for both employers and employees the ‘hard’ qualities carry far more weight in assessing the overall productivity of workers than the so-called soft qualities. The difference in weights applies for the productivity of older workers ($\chi^2 = 36.50$; $p > \chi^2 = 0.00$), as well as the productivity of younger workers ($\chi^2 = 13.44$; $p > \chi^2 = 0.00$). At conventional levels of statistical significance the coefficients of the soft and hard qualities are clearly different within equations. However, across equations the differences are not as clear-cut in Table 3: the coefficients for soft qualities 0.31 and 0.26 do not differ significantly ($\chi^2 = 0.85$; $p > \chi^2 = 0.36$) and the same applies to the coefficients of the hard qualities - respectively 0.52 and 0.60 - across young and older worker perceptions but not as clear-cut as in the case of soft qualities ($\chi^2 = 3.01$; $p > \chi^2 = 0.08$).⁴ These outcomes present us with an interesting contrast. In the picture of the various productivity characteristics (see Figures 1 and 2) older workers are credited for their social skills and commitment, but apparently these qualities are not as important in the mind of both employers and employees: qualities such as creativity and ability to use new technologies are far more important in their assessment of ‘productivity’. The result that older workers and younger workers are evaluated more

⁴ Tests performed to the separate surveys of employers and employees as presented in appendix A3 make clear that even at far lower levels of statistical significance the weights employers and employees attach to soft and hard qualities do not differ from each other. To wit for *employers*: coefficients soft qualities young and older worker: $\chi^2 = 1.38$; $p > \chi^2 = 0.24$); coefficients hard qualities young and older worker: $\chi^2 = 1.59$; $p > \chi^2 = 0.21$). And for *employees*: coefficients soft qualities young and older worker: $\chi^2 = 0.06$; $p > \chi^2 = 0.80$); coefficients hard qualities young and older worker: $\chi^2 = 1.66$; $p > \chi^2 = 0.20$)

or less equally with regard to the importance of ‘hard’ and ‘soft’ qualities suggests that employers *and* employees have a rather uniform way of viewing the productivity of young and older workers. The only exception to this rule may be reserved to respondents working in the public sector who form their opinion about the productivity of the young worker. In this sector soft qualities are (slightly) more appreciated than in sectors (see equation (1) of Table 3). But closer inspection of the separate surveys shows that it is mostly the employees in the public sector who value the soft qualities more than employees in other sectors (see Table A4). Among the employers in the different sectors one cannot detect any noticeable differences.

5. Summary and conclusions

Stereotypes play an important role in human resource management as employers have to make decisions about hiring, firing and retaining of older workers in the face of uncertainty. Making decisions under uncertainty necessarily involves making errors as expectations may prove wrong afterwards. In the face of a rapidly aging work force the need to pay attention to determinants of stereotypes in labor issues becomes more and more important. Employers in both the US and Europe (Henkens, 2005, Eschtruth et al., 2007) are still lukewarm in retaining older workers and closer inspection of the formation of stereotypes may hold the key to a better understanding why the early retirement trend is so hard to reverse or why the unfortunate unemployed older workers have such a vulnerable position on the labor market. This paper has taken a step to unravel the age-productivity nexus within firms and organizations by confronting the stereotypical perceptions of employers and employees. We arrive at a number of conclusions, which also have clear policy implications.

First of all, this study shows that not only stereotypes about *older* workers are widespread, the same applies for stereotypes about *young* workers. Younger workers are praised for their flexibility, physical and mental capacity, willingness to learn and their new technology skills. Older workers are praised for their commitment to the organization, reliability and social skills. The comparative advantage of the older worker (50 years and older) lies primarily in performing the ‘soft’ qualities of a job, whereas the comparative advantage of younger workers can be found among the ‘hard’ qualities of a job. In spite of the recognition that the old and young have their comparative advantages the stereotypical and dominant view is that older workers are less productive than younger workers. These stereotypes are established not only

among employers, but also among employees. This plain observation has far-reaching consequences. The confrontation of the perceptions of employers and employees reveals the fact one cannot put the blame of a negative stereotype on just one side of the labor market. In public debates the employer is often portrayed as the ‘villain’ who practices age discrimination or who underestimates the potential contributions which older workers can make. What our study shows is that employers and employees are not that much different. Calls for managers to rethink their performance appraisal systems and start valuing the softer qualities of work (cf. Welbourne et al., 1998) may seem logical but the problem of older worker is more deeply rooted and should start closer at home: with the employee’s perception.

Second, our study provides support for the hypotheses that an age bias is present in productivity perceptions as well as we call a ‘hierarchy bias’. Especially at the stage where the soft and hard qualities of young and older workers are determined there is clearly an age bias at work: young workers are favored more by young employees and employers than their older counterparts. The same bias can be said to exist for the older worker: as employers and employees are older, they also look more favorably upon the productivity of the older worker than their younger colleagues. However, a separate analysis for employers and employees shows that the age bias is stronger among the employees than among the employers. The age bias with respect to the overall productivity of workers can be traced back to age biases in the stereotypes with regard to the underlying ‘hard’ and ‘soft’ dimensions of productivity. The support for the hierarchy bias hypothesis shows that older workers have to deal with a labor market in which the hierarchy bias is clearly present: the average employer is clearly biased *in favor* of the young worker and *against* the older worker. More importantly this result can only partially be traced back to existing stereotypes regarding ‘hard’ and ‘soft’ dimensions of productivity. In short, in addition to the reasoned but age biased view of the hard and soft dimensions of productivity there is also an exogenous, perhaps ‘true’ age bias. This suggests that there may be other aspects weighted by employers that our model did not account for.

Finally, this study shows that the weights attached by employers and employees to the soft and the hard qualities of productivity differ substantially. Hard qualities carry a much higher weight in the evaluation of the productivity of workers than soft qualities. To some extent this result may not come as a surprise: some of the soft abilities can be viewed as tasks which benefit the organization at large (like

commitment to the organization) and the hard qualities are without exception qualities central to the performance of an *individual* task or job. In other words, in assessing the productivity of the stereotypical worker ‘collective’ qualities are not weighted as much as individual qualities. Still, most of the qualities which are collective (customer orientation, social skills, reliability) the soft and hard qualities of work should matter equally, but apparently they do not. In short, employers and employees have a more or less uniform way in assessing the productivity of workers. This observation may also has far-reaching consequences, especially with respect the promotion of age diversity in teams or organizations. This particular strategy will not be a credible human resource strategy when employers and employees have a uniform view on what makes a worker productive. For if they weigh the hard and soft elements in a uniform way, employers will always prefer the younger worker and a sound economic incentive to use age diverse teams is lacking.

References

- Ashmore, R.D. & DelBoca, F.K. (1981). Conceptual approaches to stereotypes and stereotyping. In: Hamilton, D.L. (Eds.), *Cognitive processes in stereotyping and intergroup behaviour*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Autor, D.H., Levy, F., & Murnane, R.J. (2003). The skill content of recent technological change: An empirical exploration, *Quarterly Journal of Economics*, 118, 1279-1333.
- Barth, M.C., McNaught, W., & Rizzi, Ph. (1993). Corporations and the aging work force, In: Mirvis, P.H. (Ed.), *Building the competitive workforce: Investing in human capital for corporate success*, New York: John Wiley & Sons.
- Bird, C.P., & Fisher, T.D. (1986). Thirty years later: Attitudes toward the employment of older workers, *Journal of Applied Psychology*, 71, 515-517.
- Blocklyn, P.L. (1987). The aging workforce, *Personnel*, August, 16-19.
- Bloom, D.E., & Williamson, J.G., 1998, Demographic Transitions and Economic Miracles in Emerging Asia, *World Bank Economic Review*, 12, 419-455.

- Bodenhausen, G.V. (1988). Stereotype biases in social decision making and memory: Testing process models of stereotype use, *Journal of Personality and Social Psychology*, 55, 5, 726-737.
- Brewer, M.B., Dull, V. & Lui, L. (1981). Perceptions of the elderly: Stereotypes as prototypes, *Journal of Personality and Social Psychology*, 41, 4, 656-670.
- Brewster, C., A. Hegewisch, L. Mayne & O. Tregaskis (1994). Methodology of the Price Waterhouse Cranfield Project. In: C. Brewster & A. Hegewisch (eds.). *Policy and Practice in European Human Resource Management*, 230-245. London: Routledge.
- Chasteen, A.L., Schwarz, N. & Park, D.C. (2002). The Activation of Aging Stereotypes in Younger and Older Adults, *Journal of Gerontology: Psychological Sciences*, 57B: P540-P547.
- Chiu, W.C.K., Chan, A.W., Snape, E. & Redman, T. (2001). Age stereotypes and discriminatory attitudes towards older workers: An East-West comparison, *Human Relations*, 54, 5, 629-661.
- Davis, E.P. (2005). Challenges posed by aging to financial and monetary stability, *Geneva Papers on Risk and Insurance*, 30, 542-564.
- Dunteman, G.H. (1989). Principal components analysis, *Series: Quantitative Applications in the Social Sciences*. Sage University Papers 69, Sage publications, Newbury Park, London.
- Ekamper, P. (1997). Future age-conscious manpower planning in the Netherlands: From early retirement to a new perspective on the elderly?, *International Journal of Manpower*, 18, 232-247.
- Eschtruth, A.D., Sass, S.A. & Aubry, J.P. (2007) Employers lukewarm about retaining older workers, *Center for Retirement Research, Issue in Brief*, no. 10, Boston College.
- Feyrer, J. (2008). Aggregate evidence on the link between age structure and productivity, *Population and Development Review, Supplement*, 34, 78-102.
- Finkelstein, L.M., Burke, M.J. & Raju, N.S. (1995). Age Discrimination in Simulated Employment Contexts: An Integrative Analysis. *Journal of Applied Psychology*, 80, 6, 652-663.
- Finkelstein, L.M. & Burke, M.J. (1998). Age Stereotyping at Work: The Role of Rater and Contextual Factors on Evaluations of Job Applicants. *The Journal of General Psychology*, 125, 4, 317-345.

- Finkelstein, L.M., Higgins, K.D. & Clancy, M. (2000). Justifications for ratings of old and young job applicants: an exploratory content analysis. *Experimental Aging Research*, 26, 263-283.
- Fiske, S.T. & Neuberg, S.L. (1990). A continuum model of impression formation from category-based to individuating processes: influences of information and motivation on attention and interpretation. In: M.P. Zanna (ed). *Advances in experimental social psychology*. San Diego, CA: Academic Press.
- Greller, M. M. & Simpson, P. A. (1999), In search of late career: a review of contemporary social science research applicable to the understanding of late career, *Human Resource Management Review*, 9, 309-347.
- Hassell, B. & Perrewe, P.L. (1995). An examination of beliefs about older workers: Do stereotypes still exist? *Journal of Organizational Behaviour*, 16, 457-468.
- Henkens, K. (2000). Supervisors' attitudes about early retirement of subordinates, *Journal of Applied Social Psychology*, 30, 4, 833-852.
- Henkens, K. (2005). Stereotyping older workers and retirement, the managers' point of view, *Canadian Journal on Aging*, 24, 35-48.
- Hilton, J.L. & Von Hippel, W. (1996). Stereotypes, *Annual Review of Psychology*, 47, 237-271.
- Hummert, M.L., Garstka, T.A., Shaner, J.L. & Strahm, S. (1994). Stereotypes of the elderly held by young, middle-aged, and elderly adults, *Journal of Gerontology: Psychological Sciences*, 49: P240-P249.
- Hummert, M.L., Garstka, T.A. & Shaner, J.L. (1997). Stereotyping of older adults: The role of target facial cues and perceiver characteristics, *Psychology and Aging*, 12: 107-114.
- Kalleberg, A.L., Knoke, D., Marsden, P. & Spaeth, J. (1996). *Organizations in America: Analyzing their structures and Human Resource Practices*. London: Sage Publications.
- Kanfer, R. & Ackerman, P.L. (2004), Cognitive, affective, and conative aspects of adult intellect within a typical and maximal performance framework. In: D.Y. Dai & R. J. Sternberg (Eds.) *Motivation, emotion, and cognition: Integrated perspectives on intellectual functioning*. Mahwah, NJ: Erlbaum, 119-141.
- Kirchner, W.K., & Durnette, M.D. (1954). Attitudes toward older workers, *Personnel Psychology*, 7, 257-265.

- Lalonde, R.N. & Gardner, R.C. (1989). An intergroup perspective on stereotype organization and processing, *British Journal of Social Psychology*, 28, 289-303.
- Lee, J.A. & Clemons, T. (1985). Factors affecting employment decisions about older workers, *Journal of Applied Psychology*, 70, 4, 785-788.
- LePine, J.A., Erez, A., & Johnson, D.E. (2002). The nature and dimensionality of organizational citizenship behavior: A critical review and meta-analysis, *Journal of Applied Psychology*, 87, 52-65.
- Linville, P.W., Fischer, G.W. & Salovey, P. (1989). Perceived distributions of the characteristics of in-group and out-group members: empirical evidence and a computer simulation, *Journal of Personality and Social Psychology*, 57, 165-188.
- Loretto, W., Duncan, C. & White, P.J. (2000). Ageism and employment: Controversies, ambiguities and younger people's perceptions, *Aging and Society*, 20, 279-302.
- Macrae, C.N. & Bodenhausen, G.V. (2001). Social cognition: categorical person perception, *British Journal of Psychology*, 92, 239-255.
- Malmberg, B., Lindh, T., & Halvarsson, M. (2008). Productivity consequences of workforce aging: Stagnation or Horndal effect?, *Population and Development Review, Supplement*, 34, 238-256.
- McEvoy, G.M. & Cascio, W.F. (1989). Cumulative evidence of the relationship between employee age and job performance, *Journal of Applied Psychology*, 74, 1, 11-17.
- McGregor, J. & Gray, L. (2002). Stereotypes and older workers: the New Zealand experience, *Social Policy Journal of New Zealand*, 18, 163-177.
- Munnell, A.H., & Sass, S.A. (2008). *Working Longer – The Solution to the Retirement Income Challenge*, Brookings Institution Press, Washington DC.
- Munnell, A.H., Sass, S.A., & Soto, M. (2008). Employer attitudes towards older workers: survey results, *Issue in Brief Series 3*, June 2006, Center for Retirement Research, Boston.
- Ng, T.W.N., & Feldman, D.C. (2008). The relationship of age to ten dimensions of job performance, *Journal of Applied Psychology*, 93, 392-423.
- OECD (2006). *Live Longer, Work Longer*, Paris: OECD.

- Oakes, P.J., Haslam, S.A. & Turner, J.C. (1994). *Stereotyping and Social Reality*. Cambridge: Blackwell Publishers.
- Paul, R.J., & Townsend, J.B. (1993). Managing the older worker – Don't just rinse away the gray, *Academy of Management Journal*, 7, 67-74.
- Pendry, L.F. & Macrae, C.N. (1994). Stereotypes and mental life: the case of the motivated but thwarted tactician, *Journal of Experimental Social Psychology*, 30, 303-325.
- Remery, C., Henkens, K., Schippers, J.J. & Ekamper, P. (2003). Managing an aging workforce and a tight labor market: views held by Dutch employers, *Population Research and Policy Review*, 22, 21-40.
- Rosen, B. & Jerdee, T.H. (1976a). The nature of job-related age stereotypes, *Journal of Applied Psychology*, 61, 2, 180-183.
- Rosen, B. & Jerdee, T.H. (1976b). The influence of age stereotypes on managerial decisions, *Journal of Applied Psychology*, 61, 4, 428-432.
- Schmidt, D.F. & Boland, S.M. (1986). Structure of perceptions of older adults: Evidence for multiple Stereotypes, *Psychology and Aging*, 1: 255-260.
- Schwartzman, A.E., Gold, D. Andres, D., Arbuckle, T.Y. & Chaikelson, J. (1987). Stability of intelligence. A 40 year follow-up, *Canadian Journal of Psychology*, 41, 244-256.
- Snyder, M. & Miene, P.K. (1994). Stereotyping of the elderly: A functional approach, *British Journal of Social Psychology*, 33, 63-82.
- Skirbekk, V. (2004), Age and individual productivity: a literature survey, *Vienna Yearbook of Population Research 2004*: 133-153.
- Skirbekk, V. (2008), Age and productivity potential: A new approach based on ability levels and industry-wide task demand, *Population and Development Review, Supplement*, 34, 191-207.
- Sturman, M.C. (2003). Searching for the inverted U-shaped relationship between time and performance: Meta-analyses of the experience/performance, tenure/performance, and age/performance relationship, *Journal of Management*, 29, 609-640.
- Tajfel, H. & Turner, J.C. (1979). An integrative theory of intergroup conflict. In: W.G. Austin & S. Worchel (eds). *The social psychology of intergroup relations*. Monterey, CA: Brooks-Cole, 33-47.

- Tang, J., & MacLeod, C. (2006). Labor force aging and productivity performance in Canada, *Canadian Journal of Economics*, 39, 582-603.
- Taylor, P. & Walker, A. (1994). The aging workforce: Employers' attitudes towards older people, *Work, Employment and Society*. 8, 4, 569-591.
- Taylor, P. & Walker, A. (1998). Employers and older workers: attitudes and employment practices, *Aging and society*. 18, 6, 641-658.
- United Nations (2006). *World Population Prospects – The 2006 Revision Population Database*, New York: UN. <http://esa.un.org/unpp/>
- Verhaegen, P. & Salthouse, T.A. (1997), Meta-analyses of age-cognition relations in adulthood. Estimates of linear and non-linear age effects and structural models, *Psychology Bulletin*, 133, 3, 231-249.
- Verkuyten, M. & Nekuee, S. (1999). Ingroup-bias: the effect of self-stereotyping, identification and group threat, *European Journal of Social Psychology*, 29, 411-418.
- Wagner, D.L., (1998). *Factors influencing the use of older workers: a survey of U.S. employers*, The National Council on the Aging, Inc. Washington, DC
- Waldman, D.A., & Avolio, B.J. (1986). A meta-analysis of age differences in job performance, *Journal of Applied Psychology*, 71, 33-38.
- Warr, P. & Pennington, J. (1993). Views about age discrimination and older workers. In: Taylor, P.A. Walker, A., Casey, B., Metcalf, H., Lakey, J., Warr, P. & Pennington, J. *Age and employment: Policies, attitudes, and practice*. Institute of Personnel Management, London.
- Weber, R. & Crocker, J. (1983). Cognitive processes in the revision of stereotype beliefs, *Journal of Personality and Social Psychology*. 45, 5, 961-977.
- Welbourne, T.M., Johnson, D.E., & Erez, A. (1998). The role-based performance scale: Validity analysis of a theory-based measure. *Academy of Management Journal*, 41, 540-555.

Appendix A1: Consistency scores of productivity scales

Table A1: The internal consistency (Cronbach's alphas) of the constructed scales for hard and soft qualities

	Employers' view		Employees' view	
	Young workers	Older workers	Young workers	Older workers
Soft qualities ^a	0.80	0.78	0.81	0.84
Hard qualities ^a	0.76	0.77	0.76	0.75

(a) Soft qualities include: social skills, reliability and commitment, accuracy and customer-oriented skills; hard qualities include: creativity, mental and physical capacity to deal with workload, new technology skills, willingness to learn and flexibility.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

Appendix A2: Descriptive statistics

The descriptive statistics of all variables used in the explanation of productivity assessments (of Table 3) are presented below in Table A2.

Table A2: Descriptive statistics^a

	Total sample		Employers		Employees	
	Mean	s.d.	Mean	s.d.	Mean	s.d.
Productivity old worker	2.48	0.65	2.33	0.64	2.57	0.65
Productivity young worker	2.87	0.62	2.86	0.59	2.88	0.63
Soft qualities old worker	3.05	0.48	2.91	0.43	3.14	0.48
Hard qualities old worker	2.10	0.47	1.94	0.44	2.20	0.46
Soft qualities young worker	2.40	0.46	2.35	0.43	2.43	0.47
Hard qualities young worker	3.01	0.43	2.90	0.41	3.08	0.43
Age (in years)	43.04	9.94	43.33	9.61	42.86	10.14
Sex (male = 0)	0.43	0.49	0.44	0.50	0.42	0.49
Education						
Low	0.16	0.36	0.04	0.20	0.23	0.42
Middle	0.30	0.46	0.22	0.41	0.32	0.47
High	0.54	0.50	0.75	0.44	0.45	0.50
Sector						
Industry	0.24	0.43	0.25	0.44	0.23	0.42
Services	0.35	0.48	0.40	0.49	0.35	0.48
Public sector	0.41	0.49	0.35	0.48	0.42	0.49
N =	1469		573		896	

(a) Soft qualities include: social skills, reliability and commitment, accuracy and customer-oriented skills; hard qualities include: creativity, mental and physical capacity to deal with workload, new technology skills, willingness to learn and flexibility.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

Appendix A3: Separate analyses for employers and employees

Tables A3 and A4 are the equivalent of Table 3 in the text with of course the exception of the hierarchy bias variable.

Table A3: How do *employers* weight hard and soft qualities of workers in evaluating overall productivity?^a

Productivity assessments of the young worker						
	Soft qualities		Hard qualities		Overall	
	Equation (1)		Equation (2)		Equation (3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Soft qualities ^b	-	-	-	-	0.31**	5.78
Hard qualities ^b	-	-	-	-	0.53**	9.13
Age	-0.003	1.70	-0.004	1.89	0.001	0.37
Sex (male = 0)	0.01	0.39	-0.03	0.87	0.03	0.63
Education (low =0)						
Middle	0.20*	2.03	0.26**	2.88	-0.01	0.05
High	0.16	1.74	0.36**	4.11	-0.05	0.41
Sector (industry = 0)						
Services	0.05	1.10	0.11*	2.54	0.02	0.37
Public sector	0.13**	2.77	0.14**	3.12	-0.05	0.89
Constant	2.25**	14.30	2.69**	18.21	0.55*	2.19
Adj. R ²	0.03		0.07		0.24	
Productivity assessments of the older worker						
	Equation (1)		Equation (2)		Equation (3)	
Soft qualities ^b	-	-	-	-	0.22**	3.69
Hard qualities ^b	-	-	-	-	0.63**	10.67
Age	0.005*	2.38	0.004*	2.04	0.002	0.83
Sex (male = 0)	-0.06	1.44	-0.03	0.72	0.05	0.94
Education (low =0)						
Middle	0.08	0.86	0.15	1.53	0.05	0.44
High	0.05	0.56	0.15	1.63	0.15	1.28
Sector (industry = 0)						
Services	0.06	1.37	0.03	0.75	0.01	0.09
Public sector	0.06	1.14	0.12**	2.56	0.07	1.14
Constant	2.68**	16.90	1.60**	10.03	0.15	0.60
Adj. R ²	0.03		0.03		0.29	

(a) * $p < 0.05$; ** $p < 0.01$; $N = 573$; (b) Soft qualities include: social skills, reliability and commitment, accuracy and customer-oriented skills; hard qualities include: creativity, mental and physical capacity to deal with workload, new technology skills, willingness to learn and flexibility.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.

Table A4: How do *employees* weight hard and soft qualities of workers in evaluating overall productivity?^a

Productivity assessments of the young worker						
	Soft qualities		Hard qualities		Overall	
	Equation (1)		Equation (2)		Equation (3)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Soft qualities ^b	-	-	-	-	0.30**	6.82
Hard qualities ^b	-	-	-	-	0.51**	10.98
Age	-0.011**	6.58	-0.005**	3.21	-0.001	0.37
Sex (male = 0)	0.08*	2.43	0.02	0.73	0.02	0.59
Education (low =0)						
Middle	-0.04	1.04	0.00	0.04	-0.00	0.01
High	-0.06	1.50	0.05	1.17	-0.10	1.91
Sector (industry = 0)						
Services	-0.10*	2.30	0.01	0.10	-0.03	0.61
Public sector	0.02	0.54	-0.03	0.75	-0.03	0.56
Constant	2.83**	28.67	3.24**	35.25	0.64**	3.28
Adj. R ²	0.02		0.07		0.24	

Productivity assessments of the older worker						
	Equation (1)		Equation (2)		Equation (3)	
Soft qualities ^b	-	-	-	-	0.28**	6.91
Hard qualities ^b	-	-	-	-	0.59**	13.33
Age	0.012**	7.41	0.015**	10.22	-0.001	0.44
Sex (male = 0)	0.05	1.53	-0.01	0.32	-0.02	0.55
Education (low =0)						
Middle	0.02	0.57	-0.02	0.62	-0.00	0.01
High	0.06	1.33	0.03	0.87	0.14**	2.72
Sector (industry = 0)						
Services	-0.03	0.60	0.02	0.45	0.05	0.94
Public sector	0.12**	2.58	-0.04	0.86	0.06	1.22
Constant	2.59**	25.85	1.56**	16.77	0.36*	2.26
Adj. R ²	0.06		0.12		0.29	

(a) * $p < 0.05$; ** $p < 0.01$; $N = 896$;

(b) Soft qualities include: social skills, reliability and commitment, accuracy and customer-oriented skills; hard qualities include: creativity, mental and physical capacity to deal with workload, new technology skills, willingness to learn and flexibility.

Source: Employer survey NIDI-UU (2005) and NIDI Employee survey, March 2007.